LEARN ABOUT GREENHOUSE GASSES Climate Change fifth-grade curriculum-based activity

ACTIVITY 1 *Is it getting hot in here?*

Learn and play a game relating to how Infra-red radiation (reflected energy) is captured by greenhouse gasses. See what that does to the earth's temperature as more IR radiation is captured.

Florida State Standards
SC.5.L.14.2 SC.5.L.15.1 SS.5.C.2.4 SS.5.C.2.5 LA.5.5.2.2

OBJECTIVES Students will be able to

1) Explain what a green house gas is
2) Understand that greenhouse gasses trap energy / heat /IR radiation.
3) Demonstrate what happens if more greenhouse gasses are put into the atmosphere.
4) Be able to compare Infra-red radiation to heat radiating from a campfire.
5) ID the only way earth gets warmer is when (i) sun put out more energy (ii) more greenhouse gasses trap more heat (iii) energy escaping from center of earth to earth's surface.

MATERIALS

1) Labels, or some kind of costume (ID) for kids acting at CO2 molecules.
2) Labels, or some kind of costume (ID) for kids acting at methane molecules.
3) Some technique to allow kids acting as methane molecule to trap 24x as much IR energy as a CO2 molecule
4) Some activity (ping pong balls, Styrofoam balls and wire?) to allow tent groups to make CO2 molecule
5) Props / pictures/ velcro labels etc on a diagram on a to show the energy cycle of light in the atmosphere
6) Ropes to mark off "earth surface" and "edge of atmosphere" boundary.

PROCEEDURES – aim to show that as more UV rays are caught in atmosphere, the earth gets hotter.

1) Spend some time teaching about farmers' greenhouses and how they work.
2) Make that specific to the planets ability to retain heat eg Earth and Venus
3) What is a greenhouse gas? Where do they come from (natural and human introduced)
4) Light = energy = heat. CO2 and methane molecules (methane is far more effective at retaining reflected IR energy than CO2 is)
5) Play a modified version of "Predator-Prey" game. This is where some kids act as green house gasses trying to catch other kids acting as packets of reflected IR radiation. *Idea: The kids acting as CO2can only take a step to catch IR, where as methane kids can go anywhere to catch IR . To make this work have at least 4x as many kids acting as IR as there are kids acting as greenhouse gasses. Goal is to have lots of IR caught – but still have some IR exit the atmosphere*

6) *When the kids acting as IR get captured by a green house gas – they stay put and wiggle to show that they are warming up the atmosphere.*
7) Have various scenarios with more greenhouse gasses are added by burning fossil fuels and see how many more IR kids are trapped by the greenhouse gas kids.

ASK THE FOLLOWING KINDS OF QUESTIONS

How do you think extra greenhouse gasses effect the atmosphere?

How can you reduce the greenhouse gasses? What is a carbon footprint?

Name some kind of energy (e.g. incoming UV rays, reflected IR, burning fossil fuels, volcanic eruptions, sun).

http://www.epa.gov/climatechange/kids/basics/index.html

http://www.npr.org/2007/05/01/9943298/episode-1-its-all-about-carbon

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